

Scientific note

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New distribution range of the vulnerable wild goat (*Capra aegagrus* Erxleben, 1777) (Artiodactyla: Bovidae) to the south of its known extant in Iraq, with notes on its conservation

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Abstract. The wild goat (*Capra aegagrus* Erxleben, 1777) is a vulnerable ungulate confined to the rocky slopes of the Zagros Mountains forest steppes ecoregion in northern and northeastern Iraq (Kurdistan Region). Scattered populations had been reported from 31 sites distributed mainly in four Iraqi northern provinces; however, the species' current zoogeographical distribution and population trends are enigmatic. From August 2017 to April 2018, four new sightings of the wild goat were obtained from the foothills of the Zagros Mountains along the eastern and southeastern Iraq-Iran international borders. These new localities represent a new distribution range to the southernmost of the species' known extant in Iraq. Moreover, the newly discovered wild goat populations in eastern and southeastern Iraq almost certainly originated from the western Iranian populations assigned to the *Capra a. aegagrus* subspecies. Besides poaching, newly documented threats such as trapping and young capturing which severely affect the wild goat populations in Iraq are discussed.

Key words. Bovidae, *Capra aegagrus*, protected areas, ungulates, wild mammals of Iraq.

INTRODUCTION

The wild goat (*Capra aegagrus* Erxleben, 1777) is a threatened ungulate restricted to the mountainous habitats of central Afghanistan, southern Pakistan, west through Iran, western Turkmenistan, northern Iraq, the Caucasus region (Armenia, Azerbaijan, northeastern Georgia, and southern Russia), and southwestern Turkey (Weinberg et al. 2008; Macar & Gurkan 2009). In Arabia, the species once occurred in Lebanon and Syria, United Arab Emirates, and Jordan, but is now extinct in these regions (Harrison & Bates 1991; Grubb 2005).

In Iraq, the species inhabits the rocky slopes, mountain gorges, wooded hills, coniferous and Mediterranean shrubland of the Zagros Mountains mainly in the extreme northern and northeastern Iraq (Kurdistan Region) (Al-Sheikhly et al. 2015). Previously, it has been reported from Shanidar caves, mountain slopes near Zawitha, Sarsank and Amadiya in Dohuk province, Baradust Mountain, Barzan area, Zagarta Mountain, Shaglaw, Harir Dag, Rawanduz, Safin Dag and Bekma Dam in

Erbil province, recorded also from Hazar Mard, Chemchemal and Derbendi Khan in Sulaimaniyah province (Harrison & Bates 1991). Scattered small populations have been reported from Barzan area, Zararan (Zerara), foothills near Dukan Lake, Peramagroon, and Qara Dag mountains during 2010–2012 (Al-Sheikhly 2012b; Raza et al. 2012; Haba 2013; Raza 2013). More recently, a small population of wild goat has been found in Buzan Valley in the Alqosh Mountain, a newly discovered locality for this species in Nineveh province in northern Iraq (Al-Barzangi et al. 2015). Furthermore, wild goats have been reported for ten Key Biodiversity Areas (KBAs) in the mountain chains of the Kurdistan Region in northern Iraq (Nature Iraq 2017) (Fig. 1). The wild goat is listed as Vulnerable (VU) by the International Union for Conservation of Nature (IUCN) Red List due to rapid population decline attributed to over-exploitation (mainly by poaching), competition for grazing areas with domestic livestock, disturbance, and habitat destruction (Weinberg et al. 2008).

New sites for wild goat in eastern and southeastern Iraq

Four new sites for wild goat have been recently identified within the Zagros Mountains forest steppes ecoregion along Iraq-Iran eastern and southeastern international borders, the foothills of (i) Zurbatiyah (Zurbatia), (ii) Kani Sakht, (iii) Kazaneah, and (iv) Al-Teeb (red-circled sites in Fig. 1).

The foothills of Zurbatiyah (site 2 in Fig. 1) and Kani Sakht (site 3 in Fig. 1) are extending to the northeast of Badra district in Wasit province, Kazaneah (site 1 in Fig. 1) extends to the southeast of Mandli district in Diyala province (ca. 140 km far from Baghdad), and Al-Teeb (site 4 in Fig. 1) extends to the north of Myssan province. The general landscape of sites 1–3 is characterized by rocky slopes, rocky outcrops and vegetated hills, while site 4 is mainly dominated by broad rocky and gypsum valleys, arid plains, and grasslands. These habitats seem to provide food resources, water streams for drinking, hiding places, grazing areas, and possibly mating sites for wild goats.

Our intensive interviews with local hunters and villagers indicated that several scattered herds of 15–80 wild goats are frequently chased and persecuted by local hunters along the foothills of eastern and southeastern Iraq where small resident populations may be present. In August 2017, two adult males and an adult female with twin offspring (ca. 3 weeks old) were shot in the rocky slopes of Zurbatiyah foothills by local hunters (Fig. 2b). In February 2018, three adult males were shot in the foothills of Kani Sakht (Fig. 2e–f), and four adult males were shot in the foothills of Kazaneah in November 2018 (Fig. 2g). Recent reliable reports indicate that scattered nomadic herds of wild goats were frequently observed and chased by local hunters in the foothills of Al-Teeb in March–April 2018 which represents the southernmost sighting of this species in Iraq (BM Al-Taei, pers. comm. 2019). All of the examined wild goat male carcasses showed a russet-brown pelage with black stripes on the back, around the withers, on the front of legs and on the edge of the pale-brown belly, and black foreheads with long black beards and long horns curved backwards.

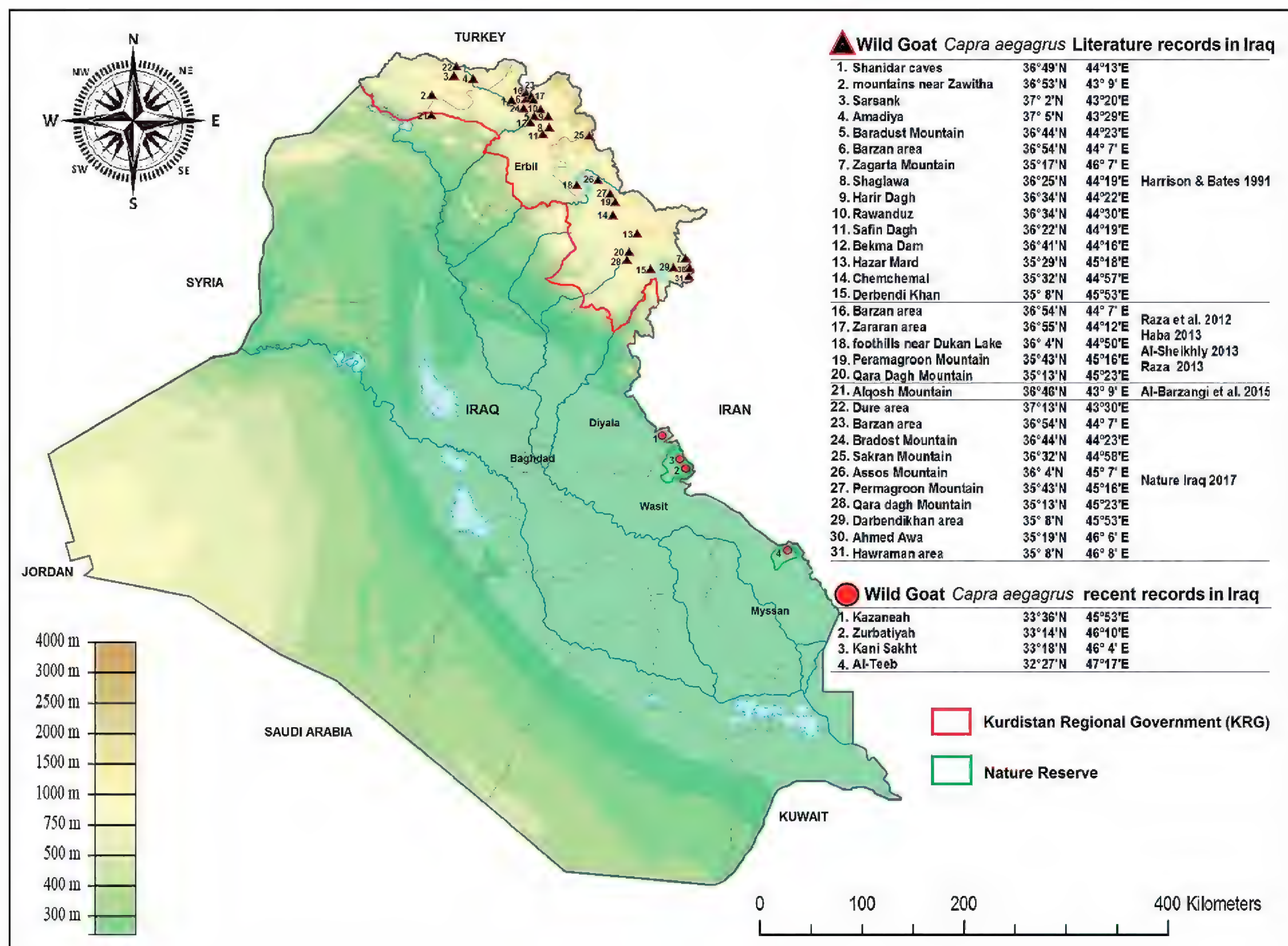


Fig. 1. Literature and recent records of Wild goat *Capra aegagrus* Erxleben, 1777 in Iraq.

The current zoogeographical range of wild goat in Iraq is represented by a patchy distribution pattern of scattered populations of the subspecies *C. a. aegagrus* which mainly exist in northern and northeastern Iraq (Kurdistan Region) (Al-Sheikhly & Haba 2014; Al-Sheikhly et al. 2015). However, the Iraqi largest sedentary populations of wild goat are known from Peramagroon, Qara Dag, and Barzan mountains where they are protected by the Kurdistan Forestry Police and preserved by tribal communities for decades in the latter mountain (Raza et al. 2012; Haba 2013). The Forestry Police of Mergasur estimated more than 1000 wild goats thriving in Barzan area, from which over 200 individuals had died due to the outbreak of goat plague or Peste des Petits Ruminants (PPR) in August 2010 and in 2011 (Nature Iraq 2017).

During a field expedition on 26th of August 2017, a herd of 94 wild goats (46 adult males; 31 adult females; 17 juveniles) was counted using point count method (e.g., Gundogdu 2011) in an area of 400 ha (0.235 individual/ha) of wooded mountain slopes in Zerara (Barzan area) in Erbil province in northern Iraq (Fig. 2c–d). Adult males (≥ 2 –3 years) were representing ca. 50% of the observed population (Fig. 2a); a ratio supported by interviews with Kurdish villagers and forestry policemen. In spite of surveying only a small proportion of Zerara area, our count was higher than the previously known estimate (80 individuals/summer 2010, Nature Iraq 2017). The increase of wild goat population size in Barzan area may be attributed to the protection provided by the local communities and Kurdistan Regional Government (KRG); yet, further monitoring may reveal better estimates. However, our newly discovered wild goat localities in eastern and southeastern Iraq are distant ca. 200 km away from the largest resident populations in northern Kurdistan and represent the southernmost distribution range of the species in Iraq.

The newly discovered wild goat populations in eastern and southeastern Iraq most certainly originated from Iranian populations that inhabit the Zagros Mountains of western Iran. Wild goat is widely distributed in Iran; it has been recorded from 31 provinces and reported from 190 protected areas throughout the country (Karami et al. 2008; Yusefi et al. 2019). In Ilam province in western Iran, the Kolan (Golan) Protected Area (33°23' N, 46°9' E) and Bina and Bijar No-hunting area (33°41' N, 45°56' E) are the most adjacent protected areas to our sites 1–3, while Dinar Kuh (Dinar Kooch) (32°50' N, 47°20' E) Protected Area is the closest protected area to our site 4 (Darvishsefat 2006; Yusefi et al. 2019; UNEP-WCMC 2020) (Fig. 1). However, Dehloran city is placed between Dinar Kuh Protected Area and site 4; therefore, wild goats are probably using the free area of ca. 7 km of Iraq-Iran international border to reach site 4. Furthermore, the free area of the international border seems important for wild goat to move from well protected areas and no-hunting zones in Iran to Iraq.

In Iran, the mating season of wild goat starts in mid-fall (October–December) and in November in southeastern Turkey, when both sexes aggregate in herds and males' courtship display starts (Korshunov 1994; Ziaie 2008; Esfandabad et al. 2010). The dominant large adult males push the young and sick goats out of the herd which migrate to adjacent habitats in search for new hiding and grazing places. Furthermore, after mating, the large adult males move to new areas to spend the summer (Gundogdu 2011). The increased conspecific competition among wild goat males may force some individuals from the Iranian western populations to migrate to eastern and southeastern Iraq. Moreover, as we mentioned before, the high numbers of different-aged wild goat males that were recently hunted in eastern and southeastern Iraq seems to support the claim that migrated animals survived the severe poaching and were able to establish new populations in eastern and southeastern Iraq. In addition, wild goat females with recently born young are frequently chased and trapped by local poachers, which confirms the breeding of this species within the territory of Iraq. Therefore, urgent and increased conservation and protection actions should be taken to save these new populations.

Esfandabad et al. (2010) suggested altitudinal and seasonal migration behaviors of wild goat as an adaptation to survive in extreme temperature and to make use of available resources throughout the year. In winter (January–March), the low accessibility to food resources due to a thick layer of snow at higher elevations forces the animals to use lower altitudes where they become exposed to natural predators and poachers (Esfandabad et al. 2010).

It is worth noting that the wild goat population of western Iran was assigned to the nominotypical subspecies *C. a. aegagrus* Erxleben, 1777, while the eastern and southeastern ones were assigned to *C. a. blythi* (Hume, 1875) (Ellerman & Morrison-Scott 1951; Heptner et al. 1988). Grubb (2005) synonymized both subspecies, and therefore, only one subspecies (*C. a. aegagrus*) occurs in Iran (Yusefi et al. 2019). Furthermore, the domestication process of goats was intensively studied by Naderi et al. using mtDNA (2007; 2008). The wild goat populations of eastern and southeastern Iraq is therefore assigned to the Iranian subspecies *C. a. aegagrus*.

Threats on the wild goat population in Iraq

Poaching

Hunting of wild goat has been identified as a major threat on the species survival (Weinberg et al. 2008; Gundogdu 2011). The illegal hunting (shooting, trapping, and catching by dogs) is a major threat on the species in Iran which increases during the rutting season in fall, when trophy males are easier to detect by poachers (Ziaie 2008). The wild goat population in Iraq had remarkably decreased

due to excessive poaching compared to the 1920s (Hatt 1959; Al-Sheikhly 2012c). In northern Iraq (Kurdistan Region), most of the wild goat populations were affected by habitat destruction and disturbance that occurred during Iraq-Iran conflict in the 1980s (Al-Sheikhly et al. 2015). However, the hunting of wild goats was prohibit-

ed by the Kurdistan Regional Government in the 1990s (Al-Barzangi et al. 2015). In eastern and southeastern Iraq, the hunting of wild goats and other sympatric bovid species is continued and seems to be uncontrolled by the local authorities and warrants urgent governmental protection. Two of our sites, Zurbatiyah and Al-Teeb



Fig. 2. **a.** Adult males wild goat *Capra aegagrus* Erxleben, 1777 grazing on rocky slopes of Zerara area in Erbil province in northern Iraq. **b.** An adult male shot in Zurbatiyah foothills (red-circled site 2 in Fig. 1). **c–d.** Females with kids observed in Zerara area in Erbil province in northern Iraq. **e–f.** Adult males shot in the foothills of Kani Sakht (site 3 in Fig. 1). **g.** An adult male shot in the foothills of Kazaneah (site 1 in Fig. 1). **h.** Asiatic Mouflon *Ovis orientalis gmelini* shot in the foothills of eastern Iraq. **i.** A wild goat kid captured from the foothills of eastern Iraq in order to be raised as a pet. Photos: a–d: ©Omar Al-Sheikhly; b–i: ©Basheer Mohammad Al-Taei.

(Zubaidaat and Teeb Oasis) have national importance for wildlife conservation. Both sites have been designated as Key Biodiversity Areas (KBAs no. 57 and 67) respectively and declared as nature reserves by the Ministry of Environment of Iraq (Nature Iraq 2017; UNEP-WCMC 2020).

Besides wild goat, the Vulnerable Asiatic mouflon *Ovis orientalis gmelini* (Blyth, 1841) (Fig. 2h) and the Vulnerable Persian goitered gazelle *Gazella subgutturosa* (Guldenstaedt, 1780) are targeted by local hunters where and whenever possible in order to be consumed as food or raised as pets (Al-Sheikhly 2012a; c). Furthermore, the Vulnerable Arabian Sand Gazelle *G. marica* (Thomas, 1897) probably exists in eastern and southeastern Iraq (Fadakar et al. 2019). It is worth mentioning, that hunting the aforementioned species is banned by the Iraqi Wild Animals Protection Law (no. 17 issued on 15th of February 2010), but the weak enforcement encourages hunters to pursue their illegal quest. The local hunters who are equipped with modern hunting rifles and fleets of all terrains are extensively searching for wild bovids in the foothills and steppes of eastern and southeastern Iraq throughout the year, with extensive poaching occurring mainly in winter and spring (January–June). Poaching of wild goat in eastern and southeastern Iraq is extensively practiced in winter (seven males/November–February 2018) when wild goats seem to abandon the higher grounds of the adjacent protected areas in western Iran to retreat to lower altitudes in eastern and southeastern Iraq.

Trapping

In our recent investigation we found that trapping has emerged as a newly documented threat on wild bovid populations in Iraq. The solitary, nomadic, and rutting wild goats, Asiatic mouflons, and Persian goitered gazelles are ambushed and trapped by large nets fired from net-modified rifles or taken by a long chase via motorcycles. The trapped animals are sold in the local animal markets or exported to the neighboring Arabian countries as pets. Our interviews with the local animal traders revealed that the prices of the trapped animals are varying based on sex and age. The price ranges from \$300–500 for wild goat juveniles and adult female Persian goitered gazelles, to \$800–900 for adult female wild goats, and \$400–500 for adult male wild goats.

Capturing/collecting of young from the wild

Our interviews, personal communications and correspondences with local hunters indicated that parturition takes place in early April to mid July in the wild goat populations of eastern and southeastern Iraq which seems concurrent to those of western Turkmenistan (Korshunov 1994) and southeastern Turkey (Gundogdu 2011). At that time, foot patrols of local trappers/collectors are search-

ing for wild goat pregnant females and/or their newly born not-weaned offspring in the rocky caverns and foothill cliffs of eastern Iraq. The interviews indicate that the kidnapped wild goat juveniles are kept to be raised as pets or sold in the local animal markets where many may die due to irresponsible care (Fig. 2i). It is worth mentioning that the capturing of the ungulate young by local trappers seems to be a common illegal practice in western and central Iraq which requires further actions (Al-Sheikhly 2012a).

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